Guidance on the Control of Substances Hazardous to Health Regulations 2002
Revision
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Executive Summary

1. The Control of Substances Hazardous to Health Regulations 2002 are enacted under the Health and Safety at Work etc, Act 1974 and impose certain duties on employers, employees and the self-employed in relation to substances hazardous to health. The object is to improve standards of occupational health. The Regulations came into force from 21st November 2002 and replace all previous versions.

2. The overriding requirement of the Regulations is that work liable to involve exposure of people to substances hazardous to health is prohibited unless a suitable and sufficient risk assessment has been made.

3. Management oversight of day-to-day implementation lies with Heads of School/Management Units (HOS). The HOS must ensure that persons competent to undertake these tasks carry out the risk assessment process covering all work involving hazardous substances in their School or under their control.

4. Principal Investigators and group leaders must ensure that suitable and sufficient risk assessments are in force for each piece of work undertaken by members of their group.

5. Exposure to substances hazardous to health must be either eliminated, or if this is not possible, kept below a level that can actually cause harm.

6. The simplest way to eliminate a risk to health is by substituting a less hazardous substance. This must be considered first.

7. Emergency procedures must be in force for limiting the risks to health from spillage or accidental release, and for regaining adequate control as soon as possible.

8. Procedures must be established to ensure that control measures are effective and are being properly used. Local exhaust ventilation (e.g. fume cupboards)

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1 SI 2002 Number 2677
2 For full definition, see Appendix 2
must be visually checked once a week. They must also be thoroughly examined and tested once every 14 months. Records of all tests must be kept for 5 years.

9. Atmospheric monitoring may be considered necessary in situations where:

- Carcinogens are handled,
- Materials having a Workplace Exposure Limit are used (See page 26),
- If there is doubt that an Occupational Exposure Standard is being complied with (where such a standard exists)
- If there is doubt that control measures are effective.

10. Health surveillance by direct methods is necessary in situations where people are known to be exposed to hazardous substances such that an identifiable disease or adverse health effect may be related to that exposure, or where there is reasonable likelihood that the disease or effect may occur.
The Control of Substances Hazardous to Health Regulations (COSHH) has been in force in various editions since 1989. Their complexity and legal structure has meant that they have been re-enacted several times (usually with additions). The 2002 edition of COSHH that came into effect in November of that year is the latest in a long series of increasingly complex regulations requiring employers to develop and monitor a management system to effectively control the use of hazardous chemical and biological agents at work.

The key factor in all versions of the Regulations has been the need for a prospective risk assessment of work involving so-called substances hazardous to health. There are two purposes to risk assessment under COSHH: to determine the situation, and what to do about the hazards and risks.

Safety legislation increasingly places emphasis on the assessment of all workplace health and safety matters, not just hazardous substances. The underlying management principles of assessments under COSHH are the same as those for any required by other health and safety legislation. In particular, the Management of Health and Safety at Work Regulations 1999\(^3\), have a wide-ranging requirement for risk assessment, overlapping a number of existing Regulations, (including COSHH). Thus an assessment made under COSHH, and the whole strategy for the management of exposure to hazardous substances under COSHH, should be integrated with the arrangements made locally in response to the Management Regulations. The University’s strategy is laid out in its Health & Safety Policy Statement and also in its supporting guidance under the Management Regulations entitled Effective Safety Management.

Risk assessment is about identifying and controlling health risks before they cause problems. To achieve this, those who control work that may involve substances hazardous to health must take the following action: -

- **Find out if you have a potential problem;**
- Decide what to do based on what you have found out;
- Act, and put the decisions into practice;
- Check that action has made improvements.

For this approach to work there needs to be commitment by senior management. HOS and other senior staff who control, direct or organise this type of work must show that they intend to minimise such risks.

‘Those who manage work are the key to what does or does not happen to improve health and safety at work. Each HOS must ensure that no work is carried out within their area of responsibility involving ‘substances hazardous to health’ without preparation of and compliance with a ‘suitable and sufficient’ risk assessment. It is for each HOS to define the management strategy appropriate to their local needs, incorporate this within their School safety policy statement, and ensure that the necessary resources are applied and maintained to effect the ends of the policy.’

If the risk assessment made under the Management Regulations indicates that work with ‘substances hazardous to health’ is a ‘significant risk’, then the School local policy statement on health and safety must include a section showing how this type of risk will be controlled.

The COSHH Regulations are not an optional extra, but must be an integral part of the work of the University; failure to comply with the Regulations is not only a criminal offence, but is likely to lead to poor work, whether scientific research, maintenance or creative activities. It is vital that School’s teach the students the best standards of safety.

When considering the dangers of substances hazardous to health we use the terms hazard and risk in particular ways. The hazard of a substance is the intrinsic property of that substance to cause harm: its toxic, carcinogenic, flammable properties etc. In relation to exposure to a substance hazardous to health, risk means the likelihood that this potential for harm will be expressed under the conditions of use, and the extent of that harm. These terms are clearly not
synonymous, and for this reason a risk assessment is much more than the collection of hazard data: a common misunderstanding.

**Responsibilities and Organisation under COSHH**

To be able to cope with complex and far reaching legislation such as COSHH, the University has to be organised effectively at the institutional and departmental level. In practical terms, the management of COSHH should not present significant problems to those departments where such structures already exist to comply with other safety legislation.

The University Court has ultimate responsibility for the health and safety of staff, students and others affected by the University’s activities. Executive responsibility for applying the decisions of Court on a day-to-day basis is delegated to the Secretary of the University Court, and thereafter to Heads of Colleges and Heads of School/Management Unit (HOS) who must arrange for duties to be further delegated as appropriate within their areas of responsibility.

**HOS** must ensure that the University Health and Safety Policy Statement is supplemented at the local level by written arrangements for the management of health and safety in the School. This local statement must indicate how the effectiveness of these arrangements is monitored.

A HOS may wish to delegate specific duties to other members of staff. This may include the formal appointment of a School Safety Co-ordinator (SSC). In larger scientific departments, the specific duties for ensuring that the Department complies with COSHH could be delegated to the Departmental Safety Co-ordinator or a Deputy SSC with specific responsibility for COSHH.

Those whose work puts them in the position of allocating duties which involves the use of substances hazardous to health (e.g. Principal Investigators, or group leaders) also have a responsibility to carry out the COSHH risk assessments (or arrange that they are carried out by competent and trained junior staff).
As part of their professional training, postgraduate and final year undergraduates should be trained to carry out COSHH risk assessment procedures.

The following is an aide memoir for school policy on COSHH for a typical scientific department. Does the policy …

- Indicate a clear commitment driven by senior management, supported by all subsidiary levels of management, to ensuring compliance with the COSHH Regulations?
- Indicate a clear commitment to the systematic elimination or reduction of risks from substances hazardous to health?
- Prohibit work involving any exposure to substances hazardous to health unless a suitable and sufficient risk assessment has been carried out?
- Require that where practicable exposure is either prevented or controlled by means other than personal protective equipment?
- Require that substances with a Workplace Exposure Limit (WEL) are controlled so as to reduce exposure as far as is reasonably practicable?
- Define the maintenance arrangements for exhaust ventilation (LEV) (e.g. fume cupboards; microbiological safety cabinets)?
- Define the arrangements for the use of personal protective equipment?
- Define the arrangements for health surveillance?
- Define the communication and training procedures of the School?
- Have a defined review period?
- Have the signature of the HOS, duly dated?

Principles of Risk Assessment under COSHH

Introduction
A COSHH risk assessment will enable valid decisions to be made about what needs to be done to prevent or control adequately exposure to substances hazardous to health. This can be achieved as part of a more broadly based risk assessment under regulation 3 of the Management of Health and Safety at Work Regulations 1999. If the substances in question are also flammable or unstable it is recommended that it is allied to a risk assessment under regulation 5 of the Dangerous Substances and Explosive Atmospheres Regulations 2002.

COSHH 2002 requires certain factors to be taken into consideration when compiling a risk assessment. These are:

1. The hazardous properties of the substances.
2. How it will be used.
3. The amount of the substance to be used.
4. Information on health effects provided by the supplier (e.g. the Material Safety Data Sheet or other formal guidance, e.g. from ACDP).
5. The level, type and duration of exposure.
6. Activities such as maintenance where there is the potential for a high level of exposure.
7. Any relevant occupational exposure standard.
8. The results of monitoring of exposures.
9. The risks presented by combinations of exposures to substances.

Remember, however, that not all work needs to be assessed in such detail. Only that which poses a realistic foreseeable risk to people needs to be assessed. The hazards of the work need to be considered, certainly, but if the quantities are tiny, the hazard small and therefore the risk negligible the assessment need only record the substances involved, that they will be used in accordance with the supplier's Material Safety Data Sheet and the conclusion that because the substances pose little or no risk, no further detailed risk assessment is warranted.

Five basic steps should always be followed when undertaking an assessment of a work activity under COSHH:

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4 SI 2002/2776
1. **Identify all hazards and gather other information relevant to the task.**

2. **Assess the risks from the activity and possible inter-reaction of substances.**

3. **Institute control measures relevant to the way the substances has the potential to cause harm (e.g. if by inhalation use local exhaust ventilation).**

4. **Plan how to monitor the control measures to see they are in place and are effective.**

5. **Triggers for a review of the assessment should conditions change**

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**Decide Who Will Carry out the Assessment**

In smaller Schools or in areas where there are few substances in use, it is likely that only a few people will have to be involved in the assessment process. In larger scientific Schools, where there might be hundreds of substances potentially in use, then clearly many more people will be involved. Where the use of substances is a significant and daily event, then the decision must be taken by the HOS as to which members of staff should be trained to carry out the assessments.

In general: -

- Academic staff will carry out the risk assessments for their own personal work;
- Postgraduate students should be trained to carry out risk assessments pertaining to their own research projects;

Whoever carries out the assessments must: -

- Understand the requirements of the regulations;
- Gather systematically the information relevant to exposure to the hazard and associated risks;
- Specify the steps to be taken to comply with the regulations;
- Understand the limitations of these steps;
- Be able to complete and record the assessment form accurately and succinctly.
Identify the Substances Likely to be Present

The COSHH Regulations apply to a very wide range of substances: solid (including dusts), liquid, gas or vapour. They apply to individual substances or complex mixtures, whether used in scientific research, artistic endeavour, building maintenance or cleaning. Biological agents of any sort are also included. See appendix 2 for the definition as given in the Regulations.

Much useful information will be given on the packaging of substances and will normally be accompanied by the manufacturer’s or supplier’s Material Safety Data Sheet.

People with responsibilities under this policy will want to ensure that all substances coming on to sites under their control are identified precisely.

Identify How the Substances are Hazardous

Consider each substance in turn and decide whether it is in a form in which it could be:

- Inhaled;
- Swallowed/ingested;
- Absorbed via skin (broken or intact) or eyes;
- Injected (e.g. directly, or by contaminated sharps)

Note that the same substance in a different form could have a significantly modified potential to cause harm – say, solid v dust, differing fibre size, infectious or non-infectious.

What Effects Could They Have?

For each route of entry or contact identified, find out what sort of harm could result.
- Could serious health effects, either immediate or delayed, result from a single exposure?
- Could adverse effects or death result from repeated, even low-level exposures over a period of time?
- Could there be both long-term and short-term effects?
- Could the substance cause sensitisation or allergic reaction?
- Could the substance be harmful to human reproduction or even cause cancer?
- In the case of biological agents, could they cause infection?
- Can mixtures of substances result in enhanced harmful effects?

**Determine Who is Doing What, What Does, and What Could, Happen**

Consider all groups of people: -
- Academic and technical staff;
- Undergraduate and postgraduate students;
- Ancillary staff: cleaners; maintenance workers; porters and security personnel
- Contractors;
- Visitors: members of the public; emergency services personnel
- Office staff.

**Remember that the point of assessments is not to prevent an activity, but to identify real solutions that work in practice for the problems in individual workplaces.**

Ask what happens to work practices when events such as cleaning, breakdowns, changes in personnel, and adverse weather conditions occur. These can all have an effect on whether and to what extent people are exposed.

Consider separately anyone whose working habits, size, working posture or personal hygiene practices are significantly different. This also applies to anyone who might have increased susceptibility to the effects of substances e.g. those who are immunocompromised, pregnant workers, or those atopic for (allergic to) particular substances.
Assessing/Evaluating the Risks to Health

Having found out what health hazards are present in the workplace, the assessor must decide what needs to be done so that the health of individuals is not harmed. There may well already be good managerial and technical controls in place; this is the opportunity to test whether they remain adequate or if more needs to be done.

The COSHH regulations require that specific information is gathered in order to reach a proper decision about whether these controls are adequate. Some data will be readily obtained, but clearly not all this information may be available, and it might be unreasonable or impossible to amass it all. Nevertheless the list below details the scope of what is expected. For a large project involving many people it is reasonable for all these points to be addressed. A risk assessment can only be considered to be suitable and sufficient – the standard required by the regulations – if these following points have been considered.

1. The hazardous properties of the substance.
2. Information on health effects provided by the supplier (the supplier’s MSDS).
3. The ‘risk phrase’ assigned to the substance (see page 25).
4. The level, type and duration of any exposure.
5. The circumstances of the work, including the amount of the substance involved.
6. Activities such as maintenance, where there is the potential for a high level of exposure.
7. Any relevant workplace exposure standard (WEL).
8. The effect of preventive or control measures that have been or will be taken.
9. The results of relevant health surveillance.
10. The results of monitoring exposure
11. If the work might involve exposure to more than one substance hazardous to health, the risk presented by exposure to the substances in combination.
12. The approved classification of any biological agent.

Answering these points will meet the requirements of a risk assessment. This is the stage to consider what are the aspects that need to be recorded for future reference.
Unacceptable risks to health exist if exposure is known, or found to be: -

- Occurring in situations where it is ‘reasonably practicable’ for it to be prevented;
- Inadequately controlled in relation to the priorities set out in COSHH Reg. 7 (See page 16)

In either situation, immediate corrective action is required.
Examples include: -
- Evidence of fine deposits of dust;
- Broken, ineffective, clearly defective or badly maintained control measures;
- Departure from recognised good practice;
- Complaints of discomfort or excessive chemical odour;
- If ill health is linked to exposure.

Risk Assessment Checklist

- Have you identified and assessed all the significant risks to health in the workplace?
- Do the risk assessments cover all elements of work procedures where there may be a health risk?
- Have the risk assessments identified all employees/persons who may be at risk?
- Have you used the risk assessments to help decide what practical steps should be taken to manage the risks to health?

Taking Action - Control Measures

Regulation 7 of the COSHH Regulations requires that exposure to substances hazardous to health is either prevented or where this is not reasonably practicable, adequately controlled.
If it has been concluded as a result of the risk assessment that improvements are needed, then action is necessary.

Initially by seeing if it is possible eliminate whatever is causing health risks, either directly or by substitution. If that cannot be achieved, the next step is to control the risks and so reduce the chance of the health risk being made manifest.

Selection of Measures to Prevent or Control Exposure

The COSHH regulations require that exposure to substances hazardous to health is either prevented, or where that is not reasonably practicable, adequately controlled. This form of words may be interpreted as requiring a conscious effort to replace more hazardous substances with non-hazardous or even less hazardous equivalents. Only after that option has been examined and found not to be reasonably practicable, may the succeeding options be pursued. The control measures for non-carcinogens will usually be a combination of the following hierarchy of measures:

- Totally enclosed process and handling;
- Partial enclosure with local exhaust ventilation;
- Local exhaust ventilation;
- Training of staff;
- Systems of work which minimise the likelihood of exposure;
- Minimisation of the number of exposed personnel;
- Restricted access to authorised persons only;
- Reduction of the period of exposure;
- Cleaning and disinfection procedures;
- Safe storage and disposal;
- Prohibition of eating, drinking etc.;
- Welfare and personal hygiene provision.

Clearly the control measures will depend on the outcome of the risk assessment. For example, to control exposure to a substance known or suspected of being carcinogenic (and assuming substitution is not reasonably practicable), it would be expected that the following measures would be adopted:

- Totally enclosed process and handling;
- Prohibition of eating, drinking etc;
- Extensive cleaning and disinfection procedures;
• Safe storage and disposal.
See Appendix 4: Special Features of Control Measures

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**Monitoring the Effectiveness of Control Measures**

Once the control strategy has been determined, its effectiveness must be checked periodically, e.g.;

• Is the local exhaust ventilation is functioning correctly? This will include such apparatus as fume cupboards, microbiological safety cabinets, extract ventilation for welding, downflow tables etc.
• Is personal protective equipment is being used correctly?;
• Responsibility for carrying out these tasks must be clearly assigned, preferably in writing, to a competent member of staff;
• Records must be kept of any such monitoring or tests.

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**Ensuring Control Measures are Used**

HOS and supervisory staff must ensure that all control measures are being used correctly. These could include: -

• Visual checks (as part of the School's self-inspection activities) to ensure that control measures are, in fact, being used as intended;
• Prompt remedial action where necessary. This might involve the provision of refresher training or the invocation of disciplinary procedures, depending on the circumstances;
• Staff and students are required to play their part in whatever control strategy has been instituted, and in particular they should: -
  ✓ Use the control measure(s) provided;
  ✓ Understand the limitations of the controls (if any);
  ✓ Use the personal protective equipment provided in a proper manner;
  ✓ Practice a high standard of personal hygiene;
  ✓ Promptly report any defects.
Plan for emergencies

While the risk assessment will be a reflection of normal working practices, note must be made of the potential for leaks, spills or the uncontrolled release of hazardous substances. If there is a real potential for this, then contingency plans must exist and, in the case of the most significant risks, be tested.

The primary objective of the contingency plans ought to be the containment of the hazardous substance and the minimisation of risks to health. This will include arrangements for spill control, emergency personal protective equipment, and waste disposal.

Anyone not concerned with the emergency action should be excluded from the area.

Monitoring Exposure

Monitoring of exposure to substances hazardous to health under the COSHH regulations means the use of valid occupational hygiene techniques to derive a quantitative measure of exposure.

Monitoring is considered ‘requisite’ under the Regulations: -

• Where deterioration of the control measures could cause a serious health effect;
• To ensure that an occupational exposure limit is not being exceeded;
• To ensure the effectiveness of control measures.

To be regarded as suitable, records must be kept which provide sufficient information to determine: -

• When the monitoring was done and what results;
• The monitoring procedure used, and;
• The location of the work and, in the case of personal samples, the names of those involved (kept under conditions of confidentiality under the Data Protection Act).
**Health Surveillance**

The objectives of health surveillance are:

- Determining an individual's suitability for the work, both before starting work and thereafter;
- The early detection of potential disease or debility in exposed individuals;
- The evaluation of control measures;
- The immune status of personnel working with biological agents.

Health surveillance will always include the keeping of individual health records. The range of surveillance procedures can include:

- Biological monitoring;
- Biological effect monitoring;
- Medical surveillance by the University Medical Officer;
- Symptom enquiries;
- Review of records;
- Examination by a competent person.

For an extensive discussion of the procedures of health surveillance, the reader is referred to paragraphs 211-238 of the General Approved Code of Practice under the Regulations. If a PI or Group Leader feels that health surveillance is necessary, he/she strongly advised to discuss the matter with the University Health Service.

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**Information Instruction and Training**

Generally, those working with substances hazardous to health are fully aware of the risks of working with them, simply because they, the individual researcher, have designed the experiments. However, those who organise work for less experienced people, such as undergraduates, junior technical staff, or maintenance personnel, must be aware that they have a duty to inform those persons and others who may be affected by the work, of the hazards of the proposed work and the control measures appropriate in each case. In particular information must be supplied on:

- The nature and degree of risk;
- Control measures, and in particular:
  - Personal protective equipment (and its limitations);
• Monitoring procedures;
• Health surveillance.

Training for potentially exposed personnel must be such that they do not endanger themselves or others. In particular, the training must be suitable and sufficient for them to:

• Know what they should do, and what they should not do;
• Know what cleaning, storage and disposal procedures are required;
• Use contingency plans;
• Use control methods;
• Use personal protective equipment;

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<tr>
<th>Final checklist</th>
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<tr>
<td>Do the following checks show that health risks are being controlled, or is there a need to review the system?</td>
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<tr>
<td>Levels of airborne chemicals;</td>
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<td>Performance checks on ventilation equipment, such as fume cupboards and microbiological safety cabinets;</td>
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<tr>
<td>Maintenance of personal protective equipment</td>
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<td>Records of sickness, absence and ill health</td>
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<tr>
<td>Any significant changes since the last assessment was made</td>
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<th>Recording the Significant Findings</th>
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It is important to record what the ‘significant findings’ of the risk assessment. Not only will this be proof that the law is being observed, but also it could form the basis of standard operating procedures in routine or maintenance settings, as well as provide guidance on emergency or disposal processes.

The forms contained in Appendix 3 are given as models. They are not prescriptive, but are indicative of current best practice. The forms have been designed to cover the requirements of the Approved Code of Practice under COSHH, paragraph 77. Any record should:

• Define the work processes or activities.
• Itemise the substances to which people are liable to be exposed and the form in which they occur, e.g. liquid, gas, vapour or powder.
• Detail the hazards the substances present under normal condition of use, and in circumstances that might result in an uncontrolled release of the substances(s).
• Detail the extent to which substitution of a substance or process was considered.
• Identify the people, or groups of people, liable to be exposed.
• Detail the preventive measures in place to achieve adequate control of exposure.
• Detail any monitoring or testing required to validate the effectiveness of control measures.
• State whether it is necessary to carry out atmospheric sampling and measurement and the frequency with which any further monitoring will be carried out.
• Detail the reasons for selecting particular personal protective equipment.
• Record the conclusions reached on the risks to health of any individual who might be affected by the work concerned, taking account of the control measures being used.
• Record whether it is appropriate for any individual to be placed under health surveillance, and what form this should take.
• Record when the assessment will be reviewed, or the period between successive reviews.

### Reviewing the Assessment

The risk assessment needs to be a living document, which must be revisited to ensure that it is kept up to date. The date of the first review and the length of time between successive reviews will depend on the type of hazards and risks, the activities involved and the likelihood of changes occurring.

The risk assessment must be reviewed if: -
• There is evidence to think that it may no longer be valid. For example, from: -
  o The results of tests of engineering controls.
  o The results of monitoring exposure.
  o The results of health surveillance.
Complaints from users or process operators.

- There is a significant change in the work processes or activities, especially one that may have affected people’s exposure. For example changes in:
  - The substances used.
  - The equipment used, including engineering controls.
  - Introduction of a process or method of work that is likely to affect the nature of the hazard, e.g., different forms of local exhaust ventilation.
  - Changes in quantities of substances used.
  - Changes in the occupational exposure limit
  - Changes in location of work

When reviewing the risk assessment, the opportunity should be taken to re-examine the effectiveness of the preventive or control measures. For example, the assessor should:

- Reconsider whether it is practicable to prevent exposure by changing the work activity or using a non-hazardous substance. This may be possible because of developments in technology, cheaper alternatives, equipment used and control measures.
- Reconsider whether it is practicable to use a less hazardous form of the same substance.
- Re-examine control measures to decide whether they can be improved.
Appendix 1: Changes in COSHH 2002

The main changes to the COSHH Regulations result from the UK’s requirement to conform to EC Directive 98/24/EC Protection of the health and safety of workers from the risks related to chemical agents at work. Such revisions include:

- Many new definitions. For example, hazard, risk assessment and risk. These changes are primarily extensions of existing definitions and procedural in nature; there are no substantive changes.
- New provisions on the requirement to deal effectively with emergencies.
- Regulation 6 on risk assessment has been extended to include:
  - Checks that the steps identified by the assessment to meet the requirements of the regulations are implemented;
  - Checks that the assessment must consider a specific list of items;
  - Checks that the assessment is to be reviewed if the results of any monitoring show it to be necessary;
  - The requirement to record the assessment has been extended.
- Regulation 7 has been substantially enhanced to include:
  - A specific requirement to prevent exposure to a substance hazardous to health by substituting a substance or process that eliminates or reduces the risk;
  - A list of control measures to be applied in order of priority;
  - Requirements relating to biological agents that were previously in Schedule 3
- New requirement to keep all control measures clean (not just personal protective equipment).
- New requirements for monitoring exposure of employees
- In previous versions of the COSHH Regulations, health surveillance was required under certain circumstances “unless exposure is not significant”. This sentence has been recast to indicate that health surveillance is requisite where “there is a reasonable likelihood that an identifiable disease or adverse health effect will result from that exposure.”
Appendix 2: Definition of Substances Hazardous to Health.

The concept of a *substance hazardous to health* is complicated by the definition given in the regulations. In practical terms the scope of COSHH can be thought of as being: -

- Materials used directly in work, e.g. laboratory chemicals and biological agents, paints, cleaning materials;
- Materials that arise from work, e.g. dust, fumes or waste products, or;
- Naturally occurring materials, e.g. fungal spores in agriculture, ringworm in farm animals, or allergens derived from laboratory animals

*Substance* itself means the physical form of the material: *Substance means a natural or artificial substance whether in solid or liquid form or in the form of a gas or vapour (including a micro-organism).* The definition of a substance hazardous to health comes in five parts. It is a substance: -

1. *Which is listed in Part 1 of the approved supply list as dangerous for supply within the meaning of the CHIP regulations and for which an indication of danger specified for the substance is very toxic, toxic, harmful, corrosive or irritant.* A list of assigned Risk Numbers and Phrases are shown at the end of this section. Although this approved list covers many common substances, by no means does it classify even a fraction of the substances used in the university. Further parameters are therefore necessary to encompass what is meant.

2. *For which the Health and Safety Commission has approved a maximum exposure limit or an occupational exposure standard.* Many of these are also listed in the CHIP approved list, but not all. HSE Guidance Note EH40, published annually, lists the exposure limits for about 2000 substances.

3. *Which is a biological agent.* The definition of a biological agent is further subdivided into three categories: true micro-organisms such as viruses, bacteria or cell cultures, microscopic parasites such as amoebae and the microscopic infectious forms of larger parasites, e.g. helminthic ova. The controls to be applied for safe use depend on the classification under ACDP criteria.
4. *Which is dust of any kind.* Breathing in dust can damage an individual’s health. This definition deliberately excludes asbestos as that substance has its own legislation.

5. *Which because of its chemical or toxicological properties and the way it is used or is present at the workplace creates a risk to health.* This part of the definition is to cover other hazardous substances that are not covered elsewhere. This edition of the COSHH regulations thus includes asphyxiants that were not explicitly included in earlier versions.

**Risk numbers and phrases**

Risk numbers and phrases associated with COSSH are given below. They may appear as single statements or in combination where multiple hazards exist.

- R20 Harmful by inhalation
- R21 Harmful in contact with skin
- R22 Harmful if swallowed
- R23 Toxic by inhalation
- R24 Toxic in contact with skin
- R25 Toxic if swallowed
- R26 Very toxic by inhalation
- R27 Very toxic in contact with skin
- R28 Very toxic if swallowed
- R29 Contact with water liberates toxic gas
- R31 Contact with acids liberates toxic gas
- R32 Contact with acids liberates very toxic gas
- R33 Danger of cumulative effects
- R34 Causes burns
- R35 Causes severe burns
- R36 Irritating to eyes
- R37 Irritating to respiratory system
R38  Irritating to skin
R39  Danger of very serious irreversible effects
R40  Limited evidence of carcinogenic effect
R41  Risk of serious damage to eyes
R42  May cause sensitisation by inhalation
R43  May cause sensitisation by skin contact
R45  May cause cancer
R46  May cause heritable genetic damage
R47  May cause birth defects
R48  Danger of serious damage to health by prolonged exposure
R49  May cause cancer by inhalation
R60  May impair fertility
R61  May cause harm to the unborn child
R62  Possible risk of impaired fertility
R63  Possible risk of harm to the unborn child
R64  May cause harm to breast-fed babies
R65  Harmful: may cause lung damage if swallowed
R66  Repeated exposure may cause skin dryness or cracking
R67  Vapours may cause drowsiness or dizziness
R68  Possible risks of irreversible effects

<table>
<thead>
<tr>
<th>Toxicity</th>
</tr>
</thead>
</table>

A variety of parameters is used to define toxicity and other chemical harm used in the regulations. Among these are substances to which occupational exposure limits have been assigned. Under COSHH the exposure limit of a substance is noted by Workplace Exposure Limits (WEL)
Carcinogenic means cancer causing or cancer promoting and is indicated by the risk phrase R45 in the CHIP Regulations 2002. The definition is given by regulation 13 of the CHIP Regulations. Carcinogens are considered to be a special form of substances hazardous to health under COSHH and are described in Appendix 1 of the Approved Code of Practice.

Chemical and biological substances that cause asthma (asthmagens) are a particular issue addressed in an Appendix to the Approved Code of Practice under COSHH. Asthmagens are covered by COSHH. Substances covered are listed in the HSE publication *Asthmagens*.

<table>
<thead>
<tr>
<th>Asthmagens</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Azocarbonamide</td>
<td>Carmine</td>
</tr>
<tr>
<td>Chloramine-T</td>
<td>Halogenoplatinates</td>
</tr>
<tr>
<td>Cow epithelium/urine</td>
<td>Crustacean proteins</td>
</tr>
<tr>
<td>Ethylenediamine</td>
<td>Glutaraldehyde</td>
</tr>
<tr>
<td>Isocyanates</td>
<td>Laboratory animal excreta/secretia</td>
</tr>
<tr>
<td>Maleic anhydride</td>
<td>Methyltetrahydrophthalic anhydride</td>
</tr>
<tr>
<td>Penicillins</td>
<td>Persuphates</td>
</tr>
<tr>
<td>Piperazine fume</td>
<td>Some reactive dyes</td>
</tr>
<tr>
<td>Some softwood dusts anhydride</td>
<td>Spiramycin</td>
</tr>
<tr>
<td>Trimellitic anhydride</td>
<td>Tetrachlorophthalic</td>
</tr>
</tbody>
</table>

COSHH does not apply to general environmental asthmagens such as grass pollens and fungal spores, unless the work activity generates them or leads to their occurrence at higher concentrations than are normally present in the general environment.
Biological agent means a micro-organism, cell culture or human endoparasite, whether or not genetically modified, which may cause infection, allergy, toxicity or similar hazard. Cell culture means the in vitro growth of cells derived from multicellular organisms. Micro-organism means a microbiological entity, cellular or non-cellular which is capable of replication or of transferring genetic material.

Appendix 3 – Model Forms for Risk Assessment

Initially all chemical and biological hazards need to be considered as candidates for full risk assessment. Some of the more straightforward risks can be considered negligible and the assessment process halted at that point. Even if this is the case, a note ought to be made to demonstrate to stakeholders that the assessment process has been considered, and the law observed.

These model forms are offered to users of chemical and biological hazards to help the assessment. Their use is not a formal requirement, and users are free to use a form that better suits their own needs.

The following checklist is given as an aide memoir for those entrusted with the design of risk assessment forms.

- Define the work activity. This could mean:
  - A 'one person' research project;
  - A group activity in one laboratory or workshop;
  - A University-wide activity involving a few or many people.

- Are there grounds for concluding that the work procedure is not a risk to health?
  - E.g. quantities are too small to constitute any risk to health under foreseeable circumstances of use, even if control measures broke down;

\footnote{The risk assessment of genetically modification, of course, is covered by separate legislation, e.g. the Genetically Modified Organisms (Contained Use) Regulations 2000, SI 2000 Number 2831 as amended by SI 2001 Number 2626.}

UNIVERSITY OF GLASGOW Safety & Environmental Protection Services
Telephone: 0141-330-5532 Email: safety@glag.ac.uk

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• If this is the case complete the ‘accreditation section’.

• Define location of work;
• Define training for work activity, i.e. the competence necessary for those who have to do the work;
• Define the supervision. Is the work routine and to be carried out unsupervised; will the work require an approved scheme of work; or is personal supervision by an academic staff member required;
• Define monitoring (if required). Biological monitoring of workers or airborne contaminant;
• Microorganisms. Could microorganisms infect worker, and/or could the worker infect others. Define any necessary biological containment measures;
• Data used to support conclusions. E.g. suppliers Material Safety Data Sheets; scientific literature, etc.;
• Define scheme of work and local rules covering the work practice;
• Define waste disposal procedure;
• Define contingency plans for fire, spillage, accidental release etc.;
• Identify Assessor;
• Identify period and/or criteria triggering review of assessment;
• Signature of assessors and those informed of its contents and required to act on its conclusions.
Control of Substance Hazardous to Health Regulations 2002

Risk Assessment Form RA1: Chemical Risks

Department ___________________________________________________

Title of Activity __________________________________________________

Departmental Serial Number _______________________________________

Location/Class __________________________________________________

Assessed by  Checked by

Signature  Signature

Date  Date

Review date

(Note 2)

Brief description of work

"I have received a copy of this risk assessment; understand the risks and the measures that must be taken to control such risks". (All staff and students to sign) (Note 3)

<table>
<thead>
<tr>
<th>Name (print)</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

COSHH RA1 page 2

Hazard Identification

(Note 4)
Name of substance(s) | Risk Phrases | Route | Hazard Ratings
--- | --- | --- | ---
1. | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10
Physical (Heat electricity, UV etc) | Not applicable

**Routes by which exposures can occur.** (Tick relevant boxes)

<table>
<thead>
<tr>
<th>Contact, skin</th>
<th>Absorption through skin</th>
<th>Contact, eyes</th>
<th>Inhalation</th>
<th>Ingestion</th>
<th>Injection, sharps</th>
</tr>
</thead>
</table>

**Grounds for concluding exposure is not a risk to health**

Quantities or rate of use of substance(s) are too small to constitute any risk to health under foreseeable circumstances of use, even if control measures broke down. *If there are reasonable grounds for reaching the conclusion that risks are insignificant, finish this assessment now by signing above.*

**Potential Effect of Exposure**

What could be the effect of exposure to the above hazardous substances?

| Single acute exposure | Serious | Not serious | Not known |
| Repeated low exposure | Serious | Not serious | Not known |
| Adverse effect could be | Long term | Short term | Not known |
| Effects could be hazardous to human reproductive systems | Yes | No | Not known |
Description of Working Practice

Instructions for work activity

The work activity consists of well-documented routine procedures carried out frequently in a controlled environment and requiring only simple and easily understandable verbal instructions.

Scheme of Work (Continue on a separate sheet if necessary) Identify the stages in the procedure(s) where the risks are either medium or high, and describe the precautions to be taken to reduce this level of risk.

Training for work Activity

Specific training will be required

Supervision

The supervisor will approve straightforward routine work in progress
The supervisor will specifically approve the scheme of work
The supervisor will provide supervision personally to control the work
Engineering Control Measures
If parts of the work cannot be carried out on the open bench, please specify where this work will be carried out, e.g. in a fume cupboard or in specialised containment room.

Specify

If there is a requirement for personal protective equipment, what is required and when is this to be worn:
- Gloves
- Respiratory protective equipment
- Safety glasses
- Visor
- Other __________________
- None

Monitoring (Note 9)
Monitoring for airborne contaminants will be required
Biological monitoring of workers will be required

Specify

Contingency Planning (Note 10)
Written emergency instructions will be provided for workers and others who may be affected.

Provision of the following may be required in an emergency:
- Spill neutralisation chemicals

Specify

Eye irrigation point  ☐  Body shower  ☐  Other first aid provision  ☐
Breathing apparatus (with trained operator)  ☐  External emergency services  ☐
Poison antidote

Specify

Do the precautions above adequately control the risks of handling the substances specified in the manner intended? If not please specify the additional precautions required.

Specify

Disposal of waste chemicals will be by one of the following methods (consult the University Chemical Safety Adviser if in doubt)

- Flushing small quantities down the drain with excess water
- Collection of larger quantities of waste solvents in labelled solvents in labelled drums*
- Collection of waste oils in labelled drums*
- Notify the University Chemical Safety Adviser for onward transmission to a licenced company*
- Collection of radioactive waste in specified containers for storage and removal by the University Radiation Protection Service*
- To specific laboratory waste collection, after rendering safe

Tick appropriate boxes. *There may be a cost involved for this service.
Specify any other disposal method

What legal permissions have been obtained? (List and attach a copy of the forms)

Implications for other persons

The following people may need to have a copy of this risk assessment, and sign the declaration:

- Academic staff
- Technical staff
- Estates maintenance personnel
- Visiting staff
- Postgraduates
- Secretarial staff
- Undergraduates
- Cleaners
- Contractors
Control of Substance Hazardous to Health Regulations 2002

Risk Assessment Form RA2: Biological Risks

Department __________________________________________________

Title of Activity __________________________________________________ (Note 1)

Departmental Serial Number _______________________________________

Location/Class __________________________________________________

Assessed by  Checked by
Signature  Signature

Date  Date

Review date  (Note 2)

Brief description of work

I have received a copy of this risk assessment; understand the risks and the measures that must be taken to control such risks. (All staff and students to sign) (Note 3)

<table>
<thead>
<tr>
<th>Name (print)</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

COSHH RA2 page 2

NOTE: PRINTED VERSIONS OF THIS DOCUMENT ARE UNCONTROLLED COPIES AND MAY BE OUT OF DATE. CHECK ONLINE FOR THE CURRENT REVISION.
Name of Biological Agent(s)/Microorganism(s)

Synonym (if any):

Hazard Identification
For each named agent in column A, categorise each into ACDP level 1-4, and decide whether or not the agent(s) as used in the procedure presents a Low, Medium, or High risk to the user.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Name of agent(s)</td>
<td>Category</td>
<td>Low</td>
</tr>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Type of biological hazard and any special circumstances that may exclude a person from carrying out the activity.

<table>
<thead>
<tr>
<th>Risk to user</th>
<th>The biological agent could cause an infection in an individual</th>
<th>The biological agent produces a soluble toxin</th>
<th>The biological agent may induce cancer</th>
<th>The biological agent may endanger the foetus in pregnant women</th>
<th>There is a risk of allergy from the microbe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other special provisions</td>
<td>Worker may be undergoing treatment or therapy</td>
<td>Worker may be allergic to material used in the procedure</td>
<td>Worker may be atopic</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Routes by which exposures can occur.

<table>
<thead>
<tr>
<th>Contact with or bite from infected animal</th>
<th>Penetration or absorption through the skin or cut in skin</th>
<th>Direct splash contact with eyes etc.</th>
<th>Inhalation or aerosol containing the agent</th>
<th>Oral self inoculation</th>
<th>Accidental parenteral inoculation via needle stab</th>
</tr>
</thead>
</table>
Potential Effect of Exposure

What could be the effect of exposure to the above hazardous substances?

<table>
<thead>
<tr>
<th>Single acute exposure</th>
<th>Serious – requires immediate medical attention</th>
<th>Serious – may require treatment</th>
<th>Not known</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repeated low exposure</td>
<td>Serious – may require treatment</td>
<td>Not serious</td>
<td>Not known</td>
</tr>
<tr>
<td>Duration of adverse affect</td>
<td>Long term</td>
<td>Short term</td>
<td>Not known</td>
</tr>
</tbody>
</table>

Description of Working Practice

(Note 5)

Scheme of Work (Continue on a separate sheet if necessary) Identify the stages in the procedure(s) where the risks are either medium or high, and describe the precautions to be taken to reduce this level of risk.

(Note 6)

Training for work Activity

(Note 7)

Specific training will be required

Specify
Supervision (Note 8)

The supervisor will approve straightforward routine work in progress
The supervisor will specifically approve the scheme of work
The supervisor will provide supervision personally to control the work

Engineering Control Measures

If parts of the work cannot be carried out on the open bench, please specify where this work will be carried out, e.g. in a microbiological safety cabinet or in specialised containment room.

Specify

If there is a requirement for personal protective equipment, what is required and when is this to be worn:

- Gloves
- Respiratory protective equipment
- Safety glasses
- Visor
- Other ____________________
- None

Monitoring (Note 9)

Monitoring for airborne contaminants will be required
Biological monitoring of workers will be required

Specify

Contingency Planning (Note 10)

Written emergency instructions will be provided for workers and others who may be affected.

Provision of the following may be required in an emergency:

- Spill neutralisation chemicals

Specify
Eye irrigation point  [ ]  Body shower  [ ]  Other first aid provision  [ ]

Breathing apparatus (with trained operator)  [ ]  External emergency services  [ ]

Specify

Do the precautions above adequately control the risks of handling the substances specified in the manner intended? If not please specify the additional precautions required.

Specify

Disposal of waste will be done by one of the following methods (consult the University Biological Safety Adviser if in doubt)

- Exposure of liquids containing the biological agent to an appropriate disinfectant at a known cidal concentration. For Category 2 work all liquids containing the agent need to be autoclaved
- Collection of inoculated petri dishes, (sealed with clear tape to prevent lid from falling off), and culture flasks for autoclaving
- Collection of all contaminated plastics for autoclaving
- Collection of contaminated sharps in a CinBin™ for incineration*
- Collection of clinical waste in a yellow bag for onward transmission via the University to a registered company*
- To specific laboratory waste collection, after rendering safe

Tick appropriate boxes. *There may be a cost involved for this service.
Specify any other disposal method

What legal permissions have been obtained? (List and attach a copy of the forms)

Implications for other persons

The following people may need to have a copy of this risk assessment, and sign the declaration:
- Academic staff
- Technical staff
- Visiting staff
- Postgraduates
- Secretarial staff
- Undergraduates
- Cleaners
- Contractors
- Estates maintenance personnel
Notes on Completing the Risk Assessment Forms

Note 1 – Choose a title or give a serial number to facilitate departmental filing and retrieval of risk assessments.

Note 2 – These forms must be completed **before** any work with substances hazardous to health is begun, so that a **suitable and sufficient** assessment of the health risks is made. This assessment should be reviewed immediately if there is any reason to suppose that the original assessment is no longer valid due to significant changes in the work activity.

Note 3 – A copy of this assessment must be given to each staff member postgraduate research student or to each 3rd or 4th year undergraduate performing the work, and he/she must sign as receipt. When this assessment is reviewed, add below the signature of the reviewer, the date and whether the assessment was changed. Any signatories still covered by a modified assessment must then sign again to show that they are aware of the change.

Note 4 – The COSHH regulations do not apply where either the Control of Asbestos at Work Regulations or the Control of Lead at Work Regulations apply, or where the risk to health is solely from radiation, noise or pressure or similar physical hazards, nor to medicines administered as part of a controlled medical trial. Similarly the Dangerous Substances and Explosive Atmospheres Regulations cover the fire issues inherent in the use of many laboratory solvents. However, it is recommended that this risk assessment should cover both COSHH and DSEAR.

A substance should be regarded as hazardous to health if it is hazardous in the form in which it occurs in the work activity, including by-products and waste residues. The regulations specify these criteria for such a decision. (A) **substance hazardous to health means a substance:**

- **Which is listed in Part 1 of the approved supply list of the CHIP regulations**
- **For which the Heath and Safety Commission has approved an exposure limit (OES, MEL, or WEL)**
- **Which is a biological agent (See Form RA2)**
- **Which is dust of any kind ... when present in air a concentration in air equal or greater than 10mg/m³ TWA of inhalable dust or 4 mg/m³ of respirable dust.**
- **Which ... because of its chemical or toxicological properties and the way it is used or is present at the workplace creates a risk to health.**

---

8 The Chemical (Hazard Information and Packaging for Supply) Regulations 2002, SI 2002 No 1689

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For the Hazard Identification section: -
A - Name the substance or group of substances to be used in the activity and list in the columns below together with their particular exposure limit. Verify that no safer alternative could be used.

B – Classify each of the substances according to the most significant of the following categories; very toxic [VT]; toxic [T]; corrosive [CO]; irritant [IR]; harmful [H]; carcinogen/mutagen/teratogens [CMT].
C – Decide whether or not the substances as used in the procedure present a Low, Medium or High risk to the user.

Note 5 – Where an assessment of risk is simple and obvious and where the work activity is straightforward and clear verbal instructions can be easily given, a written scheme of work is unnecessary.

Note 6 – The scheme of work is a statement of how the work activity is going to be carried out safely. It should specify the ways in which the hazardous substances are to be used or handled, and should give sufficient details to identify the precautions necessary to control the risks that arise from working with the hazardous substances.

Note 7 – Any specific training required to ensure that persons involved in the work activity can operate safely should be described here. This is particularly important so that persons can understand and comply effectively with the scheme of work, where this has been formulated.

Note 8 – The level of supervision must always be appropriate to the competence of the individuals involved in the work activity.

Note 9 – For the majority of work, atmospheric monitoring should not be necessary for protecting health, providing sufficient thought has gone into ensuring the adequacy of control measures in relation to risks, and the control measures are properly used and maintained. For further information on monitoring and health surveillance see the Approved Code of Practice under the Regs, paragraphs 186-238.
Note 10 – Contingency planning is required to limit the extent of the risk arising from an uncontrolled release of a hazardous substance and for regaining control as quickly as possible.
Appendix 4 - Special Features of Control Measures

Local Exhaust Ventilation

The fundamental purpose of local exhaust ventilation (LEV) is to entrain contamination in a stream of air and either dilute it or filter it so that it poses less of a risk to the operator and those nearby. The risk assessment process will show when and what type of LEV might be necessary. Preventive maintenance will be essential to ensure that this process remains effective. Some LEV is relatively portable and used to reduce exposure to substances such as soldering fume, or dusts or vapours of low to medium toxicity or of nuisance value that are produced from a single small source.

Fume cupboards

Fume cupboards are safety devices designed to protect workers who are using hazardous chemicals. Air is sucked into the cabinet past the worker, through the front of the fume cupboard. The fume cupboard is so designed that one air stream passes along the base diluting and sweeping away any dense vapour and passing under a baffle plate at the back of the cupboard. This then travels up ducting to a fan on the roof. Another air stream sweeps out the main body of the cupboard, again diluting any vapour and then passes over the top of the baffle plate and from there to the roof.

The fume cupboard protects the user against harmful vapours by three mechanisms: -

- Containing within the body of the unit
- Diluting to a safe level
- Removing and discharging safely above the roof where it is further dispersed into the atmosphere.

When the front sash has been pulled down to the working level it protects the user’s face and eyes from any projected chemical from a vigorous event.

The fume cupboard is a work area and must not be used as a storage space.
Large objects in the fume cupboard will disrupt the air flows which can lead to loss of containment which can in turn lead to the user being affected by the hazardous vapour.
Before using a fume cupboard the following checks should be made. Ensure that:

- The unit is switched on.
- There is airflow into the cabinet.
- There is nothing in the fume cupboard apart from equipment and materials needed for the activity. Other pieces of equipment and hazardous chemicals that are not required should be removed.

Set up the equipment that is to be used in the back half of the fume cupboard in such a way as to cause minimum disturbance to the airflows. Once this is done, the front sash should be lowered to as low a level as will allow access to use the equipment, but certainly not above the marked level at which the air flow was measured. The work may now begin.

As a matter of course, the work taking place should be designed to minimise the release of hazardous or dangerous chemicals, using the fume cupboards as back-up protection when dispensing or for emergencies.

**Microbiological Safety Cabinets (MSCs)**

MSCs were conceived to provide protection to those handling hazardous micro-organisms, but have evolved to include units additionally offering a sterile environment for the work. There are three principal types:

<table>
<thead>
<tr>
<th>Class</th>
<th>Protection offered</th>
<th>Containment Level of work</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Operator only</td>
<td>(1), 2 and 3</td>
</tr>
<tr>
<td>II</td>
<td>Operator and work zone</td>
<td>(1), 2 reservedly 3</td>
</tr>
<tr>
<td>III</td>
<td>Operator and work zone</td>
<td>3 and 4</td>
</tr>
</tbody>
</table>

A sub-type of class I, the hybrid class I/III unit, offers the sterility associated with a class III unit but it does not generate the same degree of operator protection and should not be deemed equivalent.

MSCs function by using airflows to capture hazardous aerosols generated during manipulations, transferring microorganisms away from the operator before entrapment in an absolute filter. They
show resemblance to fume cupboards and laminar flow cabinets, but both the latter have very
different functions and characteristics and should NEVER be used in-lieu of a safety cabinet.

Good Practice in the Use of MSCs

<table>
<thead>
<tr>
<th>Determine work intentions, and select appropriate cabinet</th>
<th>Consider nature of work, agents to be handled, is an MSC, laminar flow cabinet fume cupboard required? Which class of MSC is relevant?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check for correct functioning</td>
<td>MSC is running within parameters as shown by gauges and alarms</td>
</tr>
<tr>
<td>Operations</td>
<td>Air pathways are clear, unit not overloaded by equipment or books. Single person use unless designed for multiple operatives. Movements are gentle; do not involve repeated exiting from work zone (piston-effect)</td>
</tr>
<tr>
<td>Environment and positioning</td>
<td>Work zone is not affected by draughts (e.g. windows, people, centrifuges)</td>
</tr>
</tbody>
</table>

MSCs should be selected, installed and maintained at least to the standard of BS:EN12469:2000 or its predecessor (BS:5726:1992). Selection requires an assessment of the work and operator protection requirements but also the proposed location as draughts or physical obstacles may compromise cabinet performance. Units providing operator and/or environmental protection, (> containment level-2 status), should exhaust externally. A compromise allowing recirculation into the laboratory is sometimes acceptable for class II units but that should be deemed exceptional as it raises major difficulties for decontamination. Following installation, in-situ testing to ensure the unit meets performance criteria should apply (e.g. operator protection tests). Commissioning
Tests need to be repeated whenever an MSC is moved, or there is a major change to the local environment or the cabinet itself.

Details of servicing requirements are outlined in:

- BS14175-2: 2003 Fume cupboards – Part 2: safety and performance requirements
- Appendix 6 of ACDP’s The management design and operation of microbiological containment laboratories (ISBN 0-7176-2034-4), and;
- Appendix 1 of the Health Service Advisory Committee’s Safe working and the prevention of infection in clinical laboratories and similar facilities (ISBN 0-7176-2513-3)

All new users should be trained in correct usage of a safety cabinet in order to obtain required degrees of operator protection. To facilitate such training a short video produced by HSE, can be borrowed from SEPS.

Other LEV

As well as fume cupboards and microbiological safety cabinets that are used widely in many University departments, a range of other LEV may be in use. To comply with the COSHH regulations all such equipment requires regular maintenance and periodic “thorough examination and test” at no more than 14 monthly intervals. As such equipment is of varied type and is often highly specialised provided by the user department, responsibility for the maintenance and testing of this rests with the host department. Departmental managers therefore need to identify such equipment and make appropriate arrangements for its maintenance and periodic examination.

The features of an LEV system and some commonly encountered extraction systems are described below. These provide an indication of the breadth of equipment types that may be classed as LEV.

Most LEV systems will include the following basic features, (which have been described with fume cupboards and microbiological safety cabinets):

- A hood, enclosure, or other inlet to collect and contain the contaminant close to its source;
- Ductwork to convey the contaminant to a suitable discharge point;
- A fan or air-mover to produce the required airflow;
Some systems may also incorporate filters or additional discharge pipework. Note that although many systems will discharge air to the atmosphere, some LEV systems may filter air before discharging cleaned air back to the working area. Both total discharge and re-circulating systems are subject to the COSHH regulations.

Building ventilation systems that provide general air circulation or dilution ventilation are not generally classed as LEV systems but, if reliance is being placed on them for removal of hazardous substances, they will require similar standards of maintenance to ensure that they are effective.

1 – Workshop Fume Extraction Systems

Fixed systems typically consist of a captor hood, fan and ducting and usually discharge directly to atmosphere. Portable fume extractors are also available. These consist of a portable unit that incorporates a fan, filtration system and a flexible ducting with an inlet that can be positioned close to the fume source.

Examples of tasks where use of LEV systems has been identified includes welding, soldering, machining dusty materials, laying-up fibreglass, etc.

2 – Woodworking dust extraction equipment

Fixed woodworking machinery produces large quantities of dust and it is common for such equipment to be connected to a fixed workshop LEV system with a system of captor enclosures attached to each machine. Exhaust air is usually discharged to atmosphere after passing through a filtration system to remove the wood dust.

Many portable woodworking power tools produce significant quantities of dust and it is often advantageous to contain this by use of a LEV system that is directly attached to the tool. Most modern workshop equipment of a professional standard includes features to allow use of attached LEV. Usually the equipment is simply attached to an industrial vacuum cleaner by suitable flexible ducting. It is important that vacuums used for this purpose are fitted with suitable types of filter and, if required, advice should be sought from suppliers. In some cases extraction outlets for portable tools may be provided directly from a workshop extraction system rather than by use of portable vacuum cleaners.
3 - Laboratory LEV systems

Within the laboratory environment, although fume cupboards and microbiological safety cabinets are a very useful general-purpose containment device, worker protection can sometime be achieved more effectively and economically by LEV that is selected specifically for a particular type of task. One example of this is the use of ventilated “downdraft” tables and ventilated sinks. These produce an airflow that draws fume away from the worker and have the advantages that they are substantially less costly than fume cupboards to purchase, install and run.

4 - Other examples of laboratory type LEV include cage-changing stations, dental benches, clean room “wet decks”, and emergency fume extractors.

Periodic examination and test

Note that in order to comply with COSHH all LEV systems, regardless of type, will require regular maintenance and 14 monthly thorough examination and test by a “competent person”. The precise nature of the maintenance, examination and test and degree of competence of the tester will vary depending on the nature of the equipment. Where equipment is simple and its operation easily checked an “in-house” examination might be sufficient. However, where more complex systems are in use an examination by an external specialist is likely to be more appropriate.

Personal Protective Equipment

The reader is referred to the University’s guidance under the Personal Protective Equipment at Work Regulations 1992. It is available on the web at http://www.gla.ac.uk/services/seps/ppatwork.htm.